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SAHRA INTEGRATED MODELING APPROACH TOWARDS BASIN-SCALE WATER RESOURCES MANAGEMENT

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Water resources decisions in the 21st Century will have strong economic and environmental components and can therefore benefit from scenario analyses that make use of integrated river basin models. SAHRA (the National Science Foundation Science and Technology Center for Sustainability of semi-Arid Hydrology and Riparian Areas) is developing an integrated modeling framework based on four hierarchical levels – a physical systems model (including surface, subsurface and atmospheric components where appropriate), an engineering systems model (including agriculture, reservoirs, etc.), a human systems behavioral model (socio-economic components) and an institutional systems model (laws, compacts etc.). This integrated framework is rooted in a perceptual-conceptual systems model of the river basin and a database support structure. This paper describes the SAHRA approach to linking the various hierarchical levels and discusses how it is being applied to answer the question, under what conditions are water markets and water banking feasible? Integration of the four hierarchical levels will allow water resource managers to consider the trading of water rights and third party impacts in evaluating the potential for market-based mechanisms to allocate water resources effectively.

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